CLAIMS

1. A method for locating and classifying information sources in response to a query, the method comprising:

   (a)   providing a knowledge representation graph structure of the query to a retrieval engine that locates a collection of information sources and generates an information source knowledge representation graph structure of each located information source in the collection; and

   (b)   matching the query knowledge representation graph structure to the information source knowledge representation graph structures obtained in step (a) to generate a hierarchy of supergraph structures and subgraph structures in which each of the supergraph structures and subgraph structures corresponds to at least one information source.

2. The method according to claim 1 wherein the query knowledge representation graph structure and each of the information source knowledge representation graph structures comprises vertices that represent concepts, words and phrases.

3. The method according to claim 1 wherein the query knowledge representation graph structure and each of the information source knowledge representation graph structures comprises directed edges that represent actions and relations.

4. The method according to claim 1 further comprising:

   (c)   visually displaying the knowledge representation graph structure of the query to a user.

5. The method according to claim 1 wherein step (b) comprises displaying the supergraph structures and subgraph structures in the hierarchy.

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1   6.   The method according to claim 5 wherein step (b) further comprises displaying
2   information identifying a selected information source adjacent to a supergraph
3   and subgraph structure generated from the selected information source.

7.   The method according to claim 1 wherein step (b) comprises displaying the
     hierarchy and identifying information for each information source.

1   8.   The method according to claim 1 wherein step (a) comprises generating the
2   query knowledge representation by processing the query with a knowledge
3   extractor.

1   9.   The method according to claim 1 wherein step (a) comprises obtaining the query
2   knowledge representation from a user.

1   10. The method according to claim 1 wherein a supergraph structure comprises an
2   information source knowledge representation graph structure that does not
3   contain any vertices in query knowledge representation graph structure but
4   contains vertices connected to the query knowledge representation graph
5   structure vertices.

1   11. The method according to claim 1 wherein a subgraph structure comprises an
2   information source knowledge representation which is entirely contained within
3   the query knowledge representation graph structure.

1   12. A method for navigating and exploring an information source located by matching
2   a query knowledge representation to knowledge representations in the
3   information source, the method comprising:
4   (a)   visually displaying the query knowledge representation as a graph
5   structure having features comprising vertices connected by edges;

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6   (b)   visually displaying the content of the information source in the vicinity of

7   the graph structure; and

8   (c)   highlighting items in the information source content that correspond to the

9   vertices and edges of the graph structure.

1   13.   The method according to claim 12 further comprising:

2   (d)   highlighting a feature in the graph structure in response to a user

3   selection; and

4   (e)   highlighting an item in the information source content, which item

5   corresponds to the selected feature.

1   14.   The method according to claim 13 further comprising:

2   (f)   highlighting related features in the graph structure which are adjacent to

3   the selected feature; and

4   (g)   highlighting related items in the information source content, which related

5   items correspond to the related features.

1   15.   The method according to claim 12 further comprising:

2   (h)   highlighting an item in the information source content in response to a

3   user selection; and

4   (i)   highlighting a feature in the graph structure, which feature corresponds to

5   the selected item.

1   16.   The method according to claim 15 further comprising:

2   (j)   highlighting related items in the information source content which are

3   adjacent to the selected item; and

4   (k)   highlighting related features in the graph structure, which related features

5   correspond to the related items.

17. Apparatus for locating and classifying information sources in response to a query, the apparatus comprising:

a retrieval engine that receives a knowledge representation graph structure of the query and, in response thereto, locates a collection of information sources and generates an information source knowledge representation graph structure of each located information source in the collection; and

a graph matching processor that matches the query knowledge representation graph structure to the information source knowledge representation graph structures obtained by the retrieval engine to generate a hierarchy of supergraph structures and subgraph structures in which each of the supergraph structures and subgraph structures corresponds to at least one information source.

18. The apparatus according to claim 17 wherein the query knowledge representation graph structure and each of the information source knowledge representation graph structures comprises vertices that represent concepts, words and phrases.

19. The apparatus according to claim 17 wherein the query knowledge representation graph structure and each of the information source knowledge representation graph structures comprises directed edges that represent actions and relations.

20. The apparatus according to claim 17 further comprising a visual display that displays the knowledge representation graph structure of the query to a user.

21. The apparatus according to claim 17 further comprising a graphical user interface that displays the supergraph structures and subgraph structures in the hierarchy.

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1   22.   The apparatus according to claim 21 wherein the graphical user interface

2   comprises an area that displays information identifying a selected information

3   source adjacent to a supergraph and subgraph structure generated from the

4   selected information source.

23.   The apparatus according to claim 17 further comprising a graphical user interface

        that displays the hierarchy and identifying information for each information

3   source.

1   24.   The apparatus according to claim 17 further comprising a knowledge extractor

2   that processes the query to generate the query knowledge representation.

25.   The apparatus according to claim 17 further comprising a user interface that

        obtains the query knowledge representation from a user.

26.   The apparatus according to claim 17 wherein a supergraph structure comprises

        an information source knowledge representation graph structure that does not

        contain any vertices in query knowledge representation graph structure but

        contains vertices connected to the query knowledge representation graph

        structure vertices.

1   27.   The apparatus according to claim 17 wherein a subgraph structure comprises an

2   information source knowledge representation, which is entirely contained within

3   the query knowledge representation graph structure.

1   28.   Apparatus for navigating and exploring an information source located by

2   matching a query knowledge representation to knowledge representations in the

3   information source, the apparatus comprising:

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4   a visually display having an area for displaying the query knowledge

5   representation as a graph structure having features comprising vertices

6   connected by edges and an area for displaying the content of the information

7   source in the vicinity of the graph structure; and

8   a user selection device that enables a user to highlight items in the

9   information source content that correspond to the vertices and edges of the

10   graph structure.

1   29.   The apparatus according to claim 28 further comprising:

2   a mechanism that highlights a feature in the graph structure in response to

3   a user selection with the user selection device; and

4   a mechanism that highlights an item in the information source content,

5   which item corresponds to the selected feature.

1   30.   The apparatus according to claim 29 further comprising:

2   a mechanism that highlights related features in the graph structure which

3   are adjacent to the selected feature; and

4   a mechanism that highlights related items in the information source

5   content, which related items correspond to the related features.

1   31.   The apparatus according to claim 28 further comprising:

2   a mechanism that highlights an item in the information source content in

3   response to a user selection with the user selection device; and

4   a mechanism that highlights a feature in the graph structure, which feature

5   corresponds to the selected item.

1   32.   The apparatus according to claim 31 further comprising:

2   a mechanism that highlights related items in the information source

3   content which are adjacent to the selected item; and

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4   a mechanism that highlights related features in the graph structure, which
5   related features correspond to the related items.

33.   A computer program product for locating and classifying information sources in
2   response to a query, the computer program product comprising a computer
3   usable medium having computer readable program code thereon, including:
4   program code for providing a knowledge representation graph structure of
5   the query to a retrieval engine that locates a collection of information sources and
6   generates an information source knowledge representation graph structure of
7   each located information source in the collection; and
8   program code for matching the query knowledge representation graph
9   structure to the information source knowledge representation graph structures
10   obtained in step (a) to generate a hierarchy of supergraph structures and
11   subgraph structures in which each of the supergraph structures and subgraph
12   structures corresponds to at least one information source.

34.   A computer program product for navigating and exploring an information source
2   located by matching a query knowledge representation to knowledge
3   representations in the information source, the computer program product
4   comprising a computer usable medium having computer readable program code
5   thereon, including:
6   program code for visually displaying the query knowledge representation
7   as a graph structure having features comprising vertices connected by edges;
8   program code for visually displaying the content of the information source
9   in the vicinity of the graph structure; and
10   program code for highlighting items in the information source content that
11   correspond to the vertices and edges of the graph structure.

35. A computer data signal embodied in a carrier wave for locating and classifying information sources in response to a query, the computer data signal comprising:

program code for providing a knowledge representation graph structure of the query to a retrieval engine that locates a collection of information sources and generates an information source knowledge representation graph structure of each located information source in the collection; and

program code for matching the query knowledge representation graph structure to the information source knowledge representation graph structures obtained in step (a) to generate a hierarchy of supergraph structures and subgraph structures in which each of the supergraph structures and subgraph structures corresponds to at least one information source.

36. A computer data signal embodied in a carrier wave for navigating and exploring an information source located by matching a query knowledge representation to knowledge representations in the information source, the computer data signal comprising:

program code for visually displaying the query knowledge representation as a graph structure having features comprising vertices connected by edges;

program code for visually displaying the content of the information source in the vicinity of the graph structure; and

program code for highlighting items in the information source content that correspond to the vertices and edges of the graph structure.

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